

WE CLAIM:

1. A disk drive connectable to a host computer executing a computer program for sending a Self Monitoring Analysis and Reporting Technology (SMART) command to the disk drive, the disk drive comprising:
  - (a) a disk;
  - (b) a head actuated radially over the disk;
  - (c) an error recovery system for detecting and correcting errors in user data read from the disk;
  - (d) a cache system for caching user data received from the host computer and user data read from the disk;
  - (e) a plurality of configuration parameters stored in a non-volatile manner for configuring at least one system when the disk drive is powered on, the at least one system selected from the group consisting of the cache system and the error recovery system; and
  - (f) an interface for receiving the SMART command from the host computer, the SMART command comprising:
    - a command code comprising a predetermined value for identifying the command code as a SMART command;
    - a sub command comprising one of a plurality of predetermine values identifying one of a plurality of SMART commands selected from the group consisting of enabling SMART diagnostics, reading diagnostic data, and transmitting setup data to the disk drive; and
    - setup data for modifying the configuration parameters.
2. The disk drive as recited in claim 1, wherein:
  - (a) the disk drive further comprises a volatile semiconductor memory;
  - (b) when the disk drive is powered on, the configuration parameters are copied to the volatile semiconductor memory; and

5 (c) the setup data for modifying the configuration parameters stored in the volatile  
6 semiconductor memory for configuring the at least one system on-the-fly.

1 3. The disk drive as recited in claim 1, wherein the error recovery system comprises a  
2 plurality of retry procedures responsive to the configuration parameters.

1 4. The disk drive as recited in claim 1, wherein the error recovery system comprises an error  
2 correction code (ECC) system responsive to the configuration parameters.

1 5. The disk drive as recited in claim 4, wherein:

2 (a) the ECC system comprises a parity sector mode wherein the ECC system writes parity  
3 sectors to the disk; and

4 (b) the configuration parameters enable the parity sector mode.

1 6. The disk drive as recited in claim 1, further comprising a write-verify system for verifying  
2 a write operation by verifying recoverability of written data, wherein the at least one  
3 system configured using the configuration parameters includes the write-verify system.

1 7. The disk drive as recited in claim 6, wherein the configuration parameters enable the  
2 write-verify system.

1 8. The disk drive as recited in claim 1, wherein:

2 (a) the cache system comprises a semiconductor memory;

3 (b) the cache system reserves a block of the semiconductor memory for caching data read  
4 from the disk during a read operation; and

5 (c) the configuration parameters for configuring when the cache system releases the  
6 reserved block of semiconductor memory.

1 9. The disk drive as recited in claim 1, wherein:

2 (a) the cache system comprises a semiconductor memory; and

3 (b) the configuration parameters for configuring a number of blocks reserved in the  
4 semiconductor memory for caching write data received from the host computer.

1 10. The disk drive as recited in claim 1, wherein:

- 2 (a) the cache system comprises a semiconductor memory;  
3 (b) the disk comprises a plurality of tracks;  
4 (c) each track comprises a plurality of sectors; and  
5 (d) the configuration parameters for configuring a number of sectors read into the  
6 semiconductor memory during a read operation following a target sector of the read  
7 operation.

1 11. The disk drive as recited in claim 1, wherein:

- 2 (a) the cache system comprises a semiconductor memory;  
3 (b) the disk comprises a plurality of tracks;  
4 (c) each track comprises a plurality of sectors; and  
5 (d) the configuration parameters for configuring a number of sectors read into the  
6 semiconductor memory during a read operation preceding a target sector of the read  
7 operation.

1 12. The disk drive as recited in claim 1, wherein the computer program comprises a graphical  
2 user interface for generating the setup data in response to user input.

1 13. The disk drive as recited in claim 1, wherein:

- 2 (a) the computer program executed by the host computer is a user application program;  
3 and  
4 (b) the user application program generates the setup data independent of user input.

1 14. The disk drive as recited in claim 1, wherein the setup data is received over the Internet.

1 15. A computer program embodied on a computer readable storage medium for use in a host  
2 computer, the computer program for configuring a disk drive by transmitting setup data in  
3 a Self Monitoring Analysis and Reporting Technology (SMART) command to the disk  
4 drive, the SMART command comprising a command code, a sub command, and a buffer,  
5 the disk drive comprising a disk, a head actuated radially over the disk, an error recovery  
6 system for detecting and correcting errors in user data read from the disk, and a cache  
7 system for caching user data received from the host computer and user data read from the  
8 disk, the disk drive further comprising a plurality of configuration parameters stored in a  
9 non-volatile manner for configuring at least one system when the disk drive is powered on,  
10 the at least one system selected from the group consisting of the cache system and the  
11 error recovery system, the computer program comprising code segments for:

- 12 (a) assigning a value to the command code identifying the command code as a SMART  
13 command;  
14 (b) assigning a value to the sub command identifying the sub command as a disk drive  
15 setup command;  
16 (c) assigning setup data to the buffer, the setup data for modifying the configuration  
17 parameters of the disk drive; and  
18 (d) transmitting the SMART command to the disk drive.

1 16. The computer program as recited in claim 15, wherein:

- 2 (a) the disk drive further comprises a volatile semiconductor memory;  
3 (b) when the disk drive is powered on, the configuration parameters are copied to the  
4 volatile semiconductor memory; and  
5 (c) the setup data for modifying the configuration parameters stored in the volatile  
6 semiconductor memory for configuring the at least one system on-the-fly.

1 17. The computer program as recited in claim 15, wherein the error recovery system  
2 comprises a plurality of retry procedures responsive to the configuration parameters.

1 18. The computer program as recited in claim 15, wherein the error recovery system  
2 comprises an error correction code (ECC) system responsive to the configuration  
3 parameters.

1 19. The computer program as recited in claim 18, wherein:

- 2 (a) the ECC system comprises a parity sector mode wherein the ECC system writes parity  
3 sectors to the disk; and  
4 (b) the configuration parameters enable the parity sector mode.

1 20. The computer program as recited in claim 15, wherein the disk drive further comprises a  
2 write-verify system for verifying a write operation by verifying recoverability of written  
3 data, wherein the at least one system configured using the configuration parameters  
4 includes the write-verify system.

1 21. The computer program as recited in claim 20, wherein the configuration parameters enable  
2 the write-verify system.

1 22. The computer program as recited in claim 15, wherein:

- 2 (a) the cache system comprises a semiconductor memory;  
3 (b) the cache system reserves a block of the semiconductor memory for caching data read  
4 from the disk during a read operation; and  
5 (c) the configuration parameters for configuring when the cache system releases the  
6 reserved block of semiconductor memory.

1 23. The computer program as recited in claim 15, wherein:

- 2 (a) the cache system comprises a semiconductor memory; and  
3 (b) the configuration parameters for configuring a number of blocks reserved in the  
4 semiconductor memory for caching write data received from the host computer.

1 24. The computer program as recited in claim 15, wherein:  
2 (a) the cache system comprises a semiconductor memory;  
3 (b) the disk comprises a plurality of tracks;  
4 (c) each track comprises a plurality of sectors; and  
5 (d) the configuration parameters for configuring a number of sectors read into the  
6 semiconductor memory during a read operation following a target sector of the read  
7 operation.

1 25. The computer program as recited in claim 15, wherein:  
2 (a) the cache system comprises a semiconductor memory;  
3 (b) the disk comprises a plurality of tracks;  
4 (c) each track comprises a plurality of sectors; and  
5 (d) the configuration parameters for configuring a number of sectors read into the  
6 semiconductor memory during a read operation preceding a target sector of the read  
7 operation.

1 26. The computer program as recited in claim 15, further comprising a code segment for  
2 implementing a graphical user interface, the graphical user interface for generating the  
3 setup data in response to user input.

1 27. The computer program as recited in claim 15, further comprising a code segment for  
2 generating the setup data independent of user input.

1 28. The computer program as recited in claim 15, wherein the setup data is transmitted over  
2 the Internet.